

Some deep sea echiurans of the North-East Atlantic

by Ramlall BISESWAR

Abstract. — Descriptions of seven species, including one new species, of deep sea echiurans (*Echiura*) is given in this report. All the specimens in the collection fall into four genera of Bonelliidae. The taxonomic status of four species is uncertain since they are represented by single individuals. Their true identities will have to await the collection of additional material from that region.

Résumé. — Cette étude présente la description de sept espèces abyssales d'Echiuriens, dont une nouvelle, provenant de l'Atlantique Nord-Est. Tous les spécimens de la collection sont regroupés dans quatre genres de Bonellides. Le statut de quatre espèces représentées par un seul individu reste incertain. Pour les identifier, il faudra attendre que du nouveau matériel provenant de cette région soit collecté.

R. BISESWAR, Zoology Department, University of Durban-Westville, Private Bag X54001, Durban 4000, Republic of South Africa.

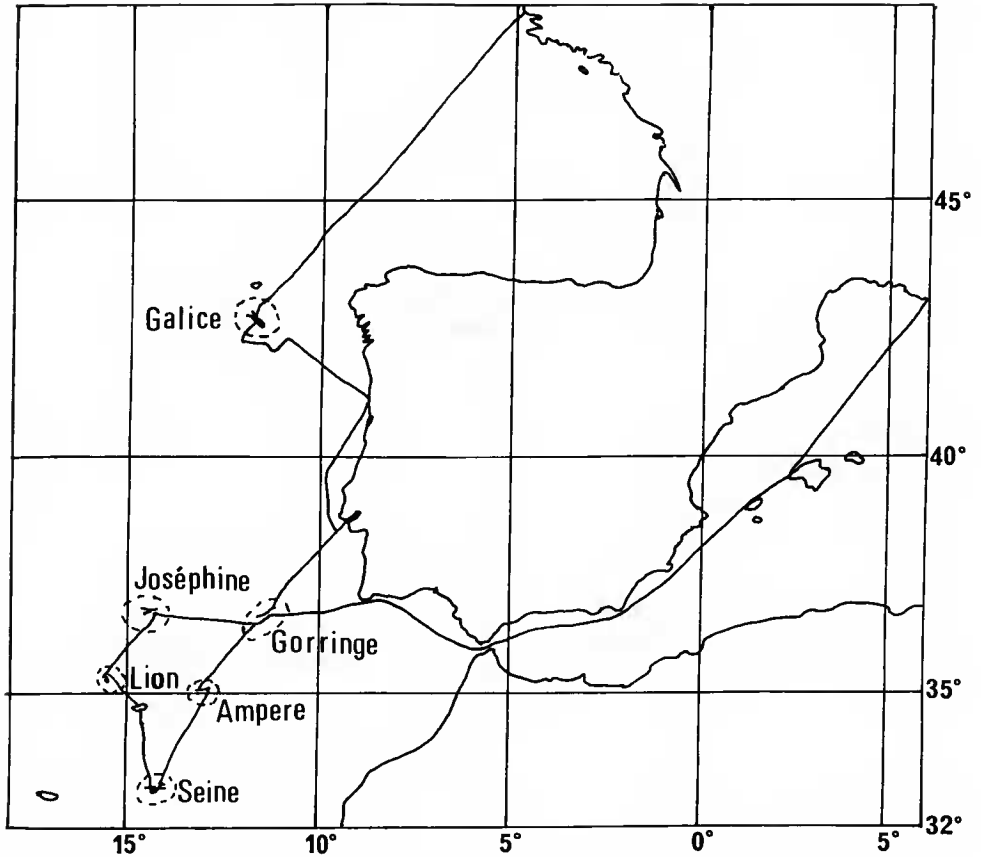
INTRODUCTION

The author studied 11 echiurans (Phylum : *Echiura*) collected in September-October 1987 on board R. V. *Noroît* during the SEAMOUNT I oceanographic expedition under Dr P. BOUCHET. It was sorted by Centre National de Tri d'Océanographie Biologique (CENTOB, IFREMER, Brest) and Zootax (SMNH, Stockholm).

During the SEAMOUNT I cruise, the lusitanian seamounts have been explored (Map 1). These banks are old structures, but separated from each other and/or from the continent by distances smaller than 250 km.

All the specimens in the present collection belong to the family Bonelliidae and include four genera and possibly seven species of which one is new. Of the remaining six, four appear to be new species but since they are represented by single individuals their taxonomic status will have to await the collection of additional material from that region. Two other species in the collection, namely, *Bonellia pumicea* and *B. minor* have been recorded previously from the Indian and Atlantic Oceans.

The holotype and paratypes of *Protobonellia annularis* have been deposited in the Muséum national d'Histoire naturelle, Paris.



MAP 1. — The North-East Atlantic seamounts. Species collected at Gorringe : *Bonellia pumicea*; *Protobonellia* sp. A; *Protobonellia* sp. B; *Metabonellia* sp. — Species collected at Galice : *Bonellia minor*; *Choanostomellia* sp.; *Protobonellia annularis* n. sp.

LIST OF GENERA AND SPECIES OF THE PRESENT REPORT

BONELLIIDAE

Bonelliinae

Bonellia Rolando, 1822 :

- *Bonellia pumicea* Sluiter, 1891
- *Bonellia minor* Marion, 1886

Choanostomellia Zenkevitch, 1964 :

- *Choanostomellia* sp.

Protobonellia Ikeda, 1908 :

- *Protobonellia annularis* n. sp.
- *Protobonellia* sp. A
- *Protobonellia* sp. B

Metabonellia Stephen & Edmonds, 1972 :

- *Metabonellia* sp.

Bonellia pumicea Sluiter, 1891

(Plate 1 A-F)

MATERIAL : 3 females and 1 male, Gorringe DW 5; collected 22.IX.1987 : locality coordinates 36°32' N-11°37,9' W, depth 180 m. 1 female, Galice DW 108; collected 19.X.1987 : locality coordinates 42°50,9' N-11°53,1' W, depth 1050 m.

DESCRIPTION

Colour of proboscis and trunk is creamy white in preserved state. Trunk of largest sexually mature female is 4.5 mm long and about 3 mm at broadest part. Proboscis is 8 mm in length, bilobed distally with ventral groove leading to mouth (plate 1 A). In another sexually mature specimen, proboscis is only 2.5 mm long. Lateral margins of proboscis are smooth and free at base. Trunk is ovoid in shape, covered with minute papillae, more prominent and closely aggregated at anterior and posterior ends. Papillae are aligned in transverse rows. Integument is thin and somewhat transparent. Ventral setae (plate 1 B) one pair, golden-yellow, about 1 mm away from anterior end of trunk. Proximal part of shaft is cylindrical with concentric markings while distal curved part is spatulate terminating bluntly. Opening of gonoduct is situated immediately behind setae and in one specimen it is located on a prominent, round eminence of body wall.

Gonoducts of sexually mature specimens are sac-like with eggs (plate 1 C), situated on left side of ventral nerve cord. Gonoduct not seen in one specimen, probably damaged due to poor preservation and in another, probably a juvenile, it is small and globular in outline. Gonostome is funnel-shaped, basal in position, stalked in two specimens but small and unstalked in one sexually mature female. Gonostomal lip with fimbriated margin. Elongate ovary is situated alongside nerve cord at posterior end of trunk. Dorsal and neurointestinal vessels connect indirectly in intestinal wall at posterior end of foregut (plate 1 D). Neurointestinal vessel is short, single throughout, joining ventral vessel posterior to setae. Anal vesicles (plate 1 E) are two main tubes which branch once or twice before terminating in bell-shaped ciliated funnels. Interbasal muscle between setae is absent. Alimentary canal is long and coiled with sand grains not moulded into faecal pellets.

Male : The male (plate 1 F) is worm-like in appearance, about 0.7 mm long and evenly rounded at both ends; found in body cavity of one sexually mature female. Setae prominent, hook-like, situated at anterior end. Opening of vas deferens is not visible externally.

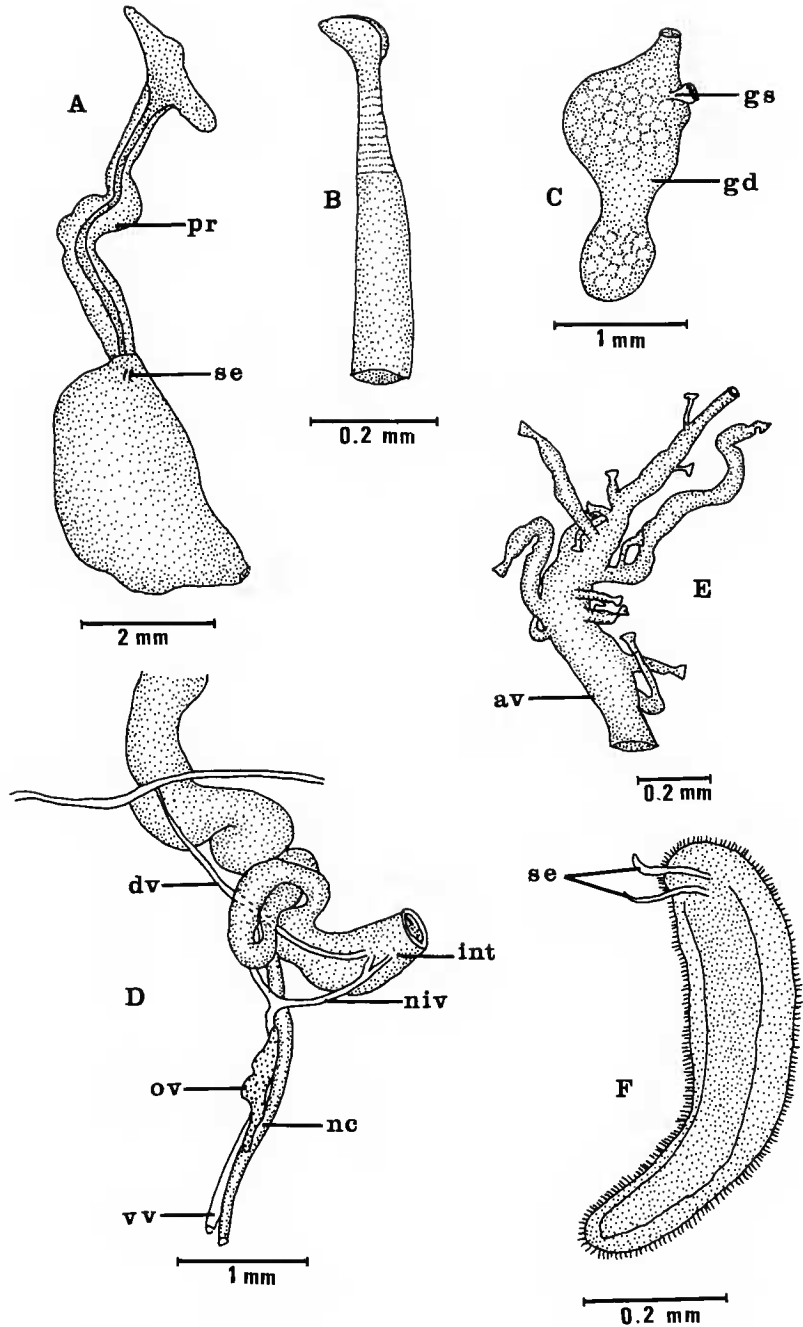


PLATE 1. — A-F, *Bonellia pumicea*: A, ventral view of female; B, seta; C, gonoduct; D, internal morphology; E, anal vesicle; F, male.

av, anal vesicle; co, collar; dv, dorsal vessel; gd, gonoduct; gp, gonopore; gs, gonostome; ibm, interbasal muscle; int, intestine; nc, nerve cord; niv, neurointestinal vessel; ov, ovary; ph, pharynx; pr, proboscis; re, rectum; se, setae; ss, setal sac; vv, ventral blood vessel.

REMARKS

The species *B. pumicea* is described originally from a single specimen from Krakatoa, Sumatra by SLUITER (1891). DATTAGUPTA (1981) recorded and briefly redescribed a single female from the North Atlantic which was much smaller in size. The present description is based on four specimens of which two are sexually mature with eggs in their gonoducts. Variations in the structure of the gonostomes are probably due to different degrees of contraction of these organs. One specimen with a trunk length of 2.5 mm differs from the others with regard to the genital pore which is located on a conspicuous, round eminence of the body wall.

Except for some minor differences, the present specimens closely approach the description provided by SLUITER (1891). *Bonellia pumicea* is closely related to *B. plumosa* Dattagupta, 1981 but differs in the structure of the body wall. Another difference lies in the blood vascular system. According to DATTAGUPTA (1981), *B. plumosa* has a broad ring sinus located at the junction of the pro- and mid-intestine.

A male specimen that was found in the body cavity of one of the sexually mature females differs from the description provided by SLUITER (1891) in lacking a narrow tail.

Bonellia minor Marion, 1886

(Plate 2 A-E)

MATERIAL : 1 sexually mature female, Galice DW 116 : collected 22.IX.87 : locality coordinates 42°52,4' N-11°50,6' W, depth 985-1000 m.

DESCRIPTION

Colour of proboscis and trunk of preserved specimen is creamy white. Trunk is ovoid in shape (plate 2A), 7 mm long and 5 mm at broadest part. Proboscis is 4 mm long and deeply bifurcate distally. Stem of proboscis is less than 1 mm broad. Lateral margins of proboscis curl inwards forming a groove but remain free at base. Single genital pore is located on a prominent papilla-like eminence which is situated in a circular depression of the body wall. A shallow groove leads from the genital pore to the mouth. One pair of ventral setae (plate 2B) is located just anterior to genital pore and partially concealed by papilla-like eminence. Setae golden-yellow in colour, each consisting of a cylindrical shaft with curved and flattened distal end terminating bluntly. Elongated papillae conspicuous over entire surface of trunk, aligned in transverse rows. Body wall moderately opaque.

Dorsal and neurointestinal vessels connect indirectly without a ring sinus (plate 2C). Neurointestinal vessel is single throughout. Single oval gonoduct (plate 2D), containing eggs, is located on right side of nerve cord. Gonostome is tubular, basal in position, without a prominent funnel. Margin of gonostome with 5 or 6 small lobes. Intestinal siphon is a narrow tube. Anal vesicles are sac-like structures into which open branched tubules with ciliated funnels (plate 2E). Left anal vesicle is larger than right one. An interbasal muscle between the setae is present.

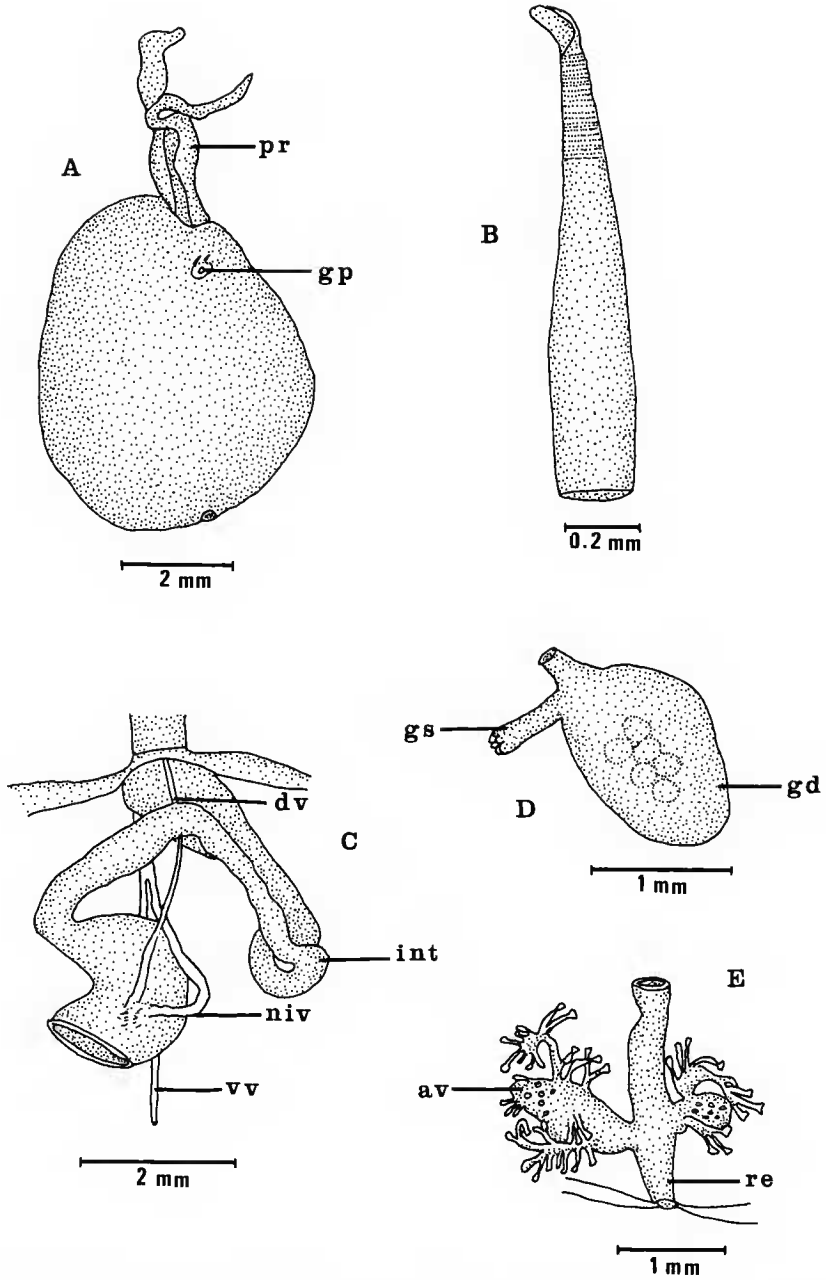


PLATE 2. — A-E, *Bonellia minor*: A, ventral view of female; B, seta; C, internal morphology; D, gonoduct; E, anal vesicles. (Abbreviations: see plate 1.)

REMARKS

The sexually mature specimen is considered to be *Bonellia minor* because of its small size, the arrangement of the papillae in transverse rows and the presence of an interbasal muscle. The anal vesicles are very similar to the description provided by MENON *et al.* (1964) but differ from the original description of the species, which according to STEPHEN and EDMONDS (1972) branch only once. *Bonellia minor* Marion was originally described from the Gulf of Marseilles, France and was subsequently recorded from several other localities. According to STEPHEN and EDMONDS (1972) this species is difficult to separate from *B. viridis* Rolando. It seems that *B. viridis* is a larger species. The length of the trunk of the Japanese specimens of *B. viridis* described by IKEDA (1904) is up to 20 mm and that of the proboscis 40-50 mm.

Choanostomellia sp. (Plate 3 A, B, C)

MATERIAL : 1 female and 1 male, Galice DW 108 : collected 19.X.1987 : locality coordinates 42°50,9' N-11°53,1' W, depth 1050 m.

DESCRIPTION

Colour of proboscis and trunk of preserved female is pale white. Proboscis is flat, 6 mm long with a broad, funnel-like collar at proximal end (plate 3 A). Collar is deeply incised mid-ventrally. Nerve loop is visible along margin of proboscis. Trunk (plate 3 A) is cylindrical, rounded posteriorly, 19 mm long and 6 mm at broadest part. Integument is smooth, transparent and devoid of papillae. Setae one pair, golden-yellow, located close together about 2 mm away from anterior end of trunk. Shaft of seta is straight, cylindrical but tapering at distal end.

Internally the gonoducts and a major part of alimentary canal are damaged probably due to poor preservation. Anal vesicles consist of two main tubes with primary and secondary branches terminating in bell-shaped, ciliated funnels (plate 3 B).

Male : Planaria-like (plate 3 C), about 2 mm long, found in coelom close to pharynx. Body without annulation, uniformly ciliated over entire surface. Ventral setae absent.

REMARKS

Two species are currently known in the genus *Choanostomellia*, namely, *C. bruuni* and *C. filatovae*, both deep sea forms described from single specimens by ZENKEVITCH (1964). *Choanostomellia bruuni* was recorded originally from the northern Arabian Sea at a depth of 3676 m while *C. filatovae* occurred off Japan in waters 1693 m deep (STEPHEN and EDMONDS, 1972). Both these species were later recorded and redescribed from the North Atlantic by DATTA GUPTA (1981).

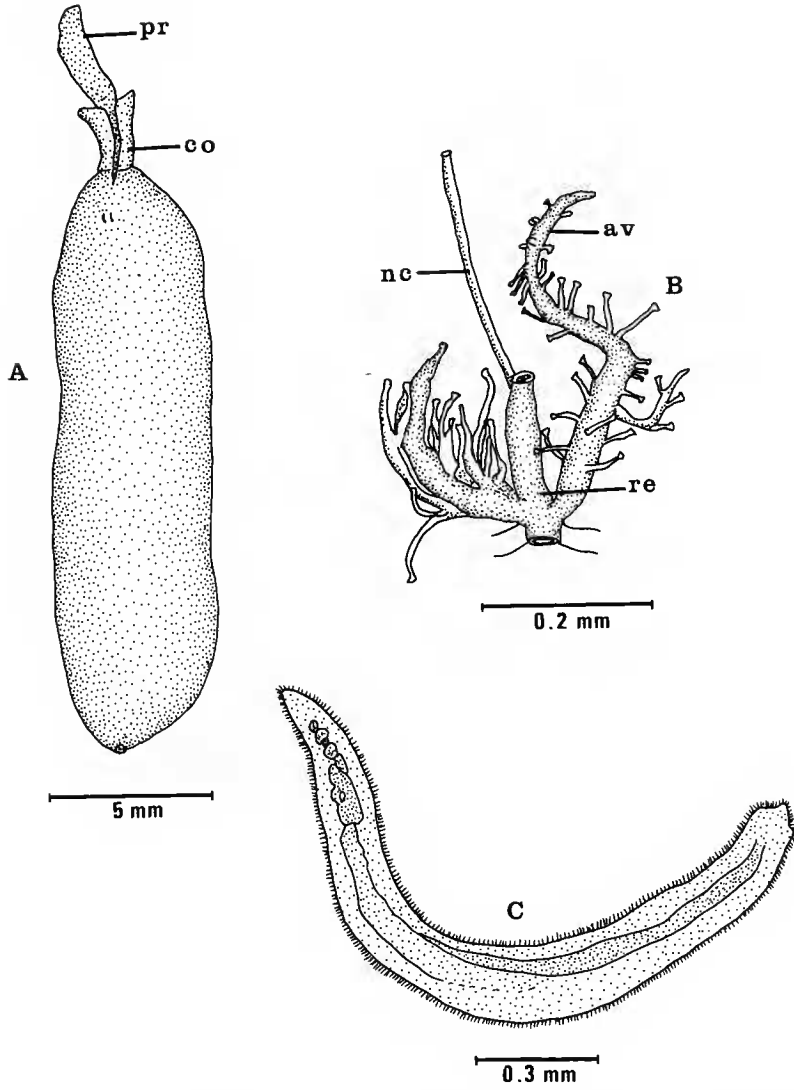


PLATE 3. — A-C, *Choanostomellia* sp. : A, ventral view of female; B, anal vesicles; C, male. (Abbreviations : see plate 1.)

The present specimen differs from the above two species in possessing a pair of ventral setae. In view of the presence of setae, the generic diagnosis by STEPHEN and EDMONDS (1972) needs emendation. The anal vesicles of *C. bruuni* also differ from the present specimen as they are long and unbranched. Unfortunately the description provided by ZENKEVITCH (1964) makes no mention of the structure of the anal vesicles of *C. filatovae*. Furthermore, the specimen on hand is much smaller in size.

On the basis of the setae and the structure of the anal vesicles it seems very likely that the present specimen represents an undescribed species. A closer study of additional material in the future will confirm its taxonomic position.

Furthermore, this is a first description of a male specimen belonging to the genus *Choanostomellia*.

Protobonellia annularis n. sp.

(Plate 4 A-E)

MATERIAL : Holotype sexually mature female, MNHN UC 352, Galice DW 108 : collected 19.X.1987 : type locality coordinates 42°50,9' N-11°53,1' W, depth 1050 m. Paratypes 2 females, MNHN UC 353, one sexually mature, specimen numbers, date of collection and locality as for the holotype : holotype and 2 paratypes dissected.

DESCRIPTION

Trunk of preserved specimens is light brown, proboscis is pale yellow. The holotype and one sexually mature paratype are almost equal in size. Proboscis of holotype is 12 mm long, Thalassema-like, somewhat flattened and broad anteriorly but narrowing towards proximal end (plate 4 A). Lateral margins of proboscis are smooth and free at base. Trunk is cylindrical (plate 4 A), 26 mm in length and 8 mm at broadest part, rounded posteriorly. In other paratype, detached proboscis is 17 mm in length, trunk is 21 mm long and 7 mm across broadest part. Body wall is thick and opaque. Papillae prominent, closely aggregated and aligned in transverse rows over entire surface of trunk. Ventral setae (plate 4 B) one pair, golden-yellow, situated about 2 mm away from anterior tip of trunk. Each seta consists of a cylindrical shaft with a slightly curved and pointed terminal end. One paratype has a single seta on left side of nerve cord. Genital pore single, situated immediately posterior to setae.

Internally there is a single gonoduct (plate 4 C) located on left side of ventral nerve cord. Gonostome stalked, funnel-shaped with conspicuous lobes around margin. Gonoducts of holotype and one paratype with round eggs. Alimentary canal long and coiled with intestinal siphon. Pharynx is bulbous. Contents of gut moulded into pellet-like faeces. Blood system without ring sinus, neurointestinal vessel in direct connection with dorsal vessel (plate 4 D). Neurointestinal vessel prominent, single throughout, not forming a loop around interbasal muscle. Paired anal vesicles long, slender tubes with numerous primary and secondary tubules terminating in ciliated funnels (plate 4 E). A strong interbasal muscle between setae is present (plate 4 C).

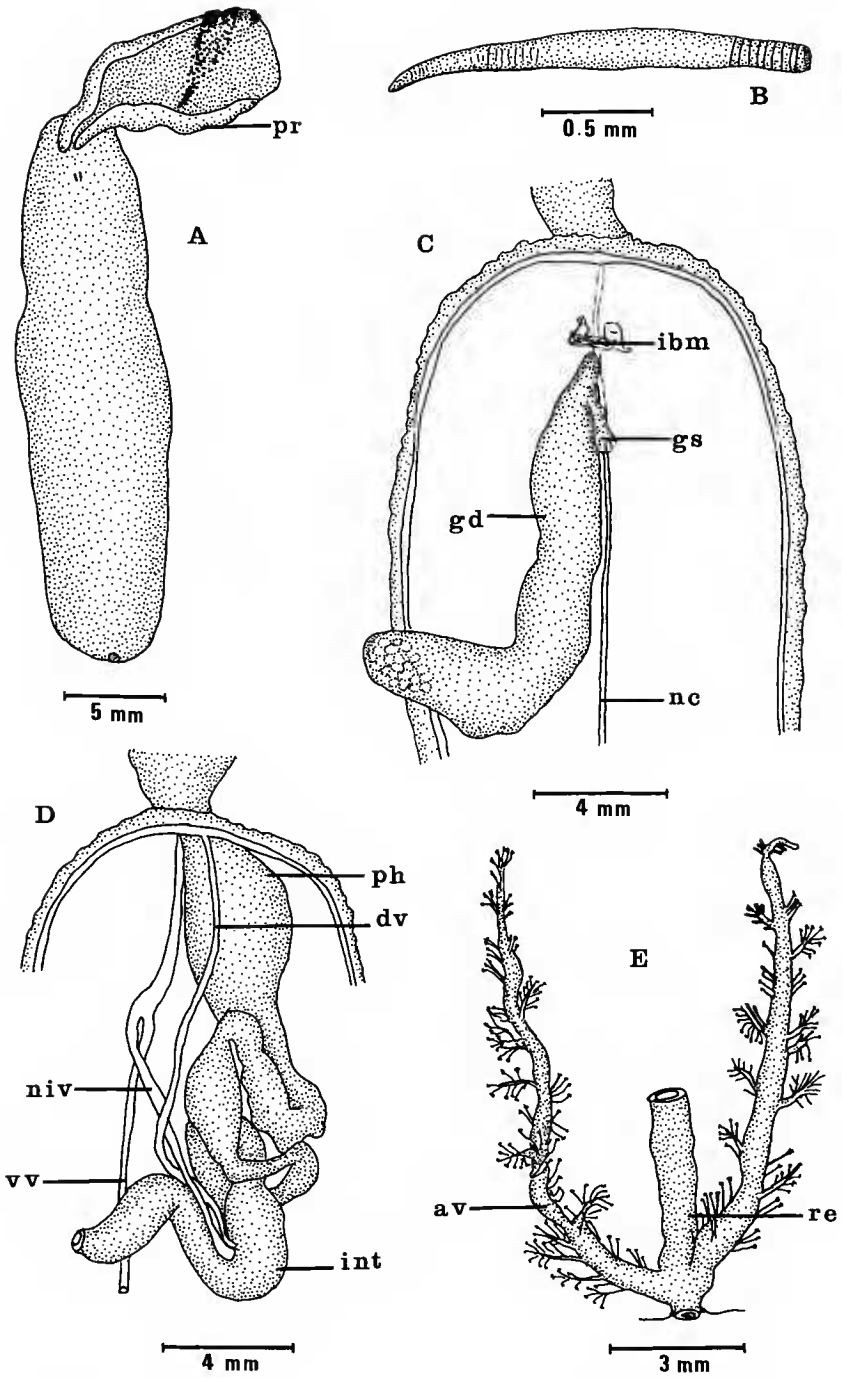


PLATE 4. — A-E, *Protobonellia annularis* n. sp. : A, ventral view of female; B, seta; C, gonoduct; D, internal morphology; E, anal vesicles. (Abbreviations : see plate 1.)

REMARKS

One of the paratypes possesses a single seta and is considered to be abnormal. Two species are currently known in the genus *Protobonellia*. The species *P. mitsukurii*, originally described by IKEDA (1908) from Sagami Bay, Japan, differs from the new species in the dimensions of the proboscis and trunk, the distribution of the dermal papillae and in the structure of the proboscis. *Protobonellia mitsukurii* is extremely small with a trunk length of 9 mm. According to IKEDA, the papillae are closely arranged anteriorly and posteriorly but more minute and scattered elsewhere. Another significant difference is that the proboscis of *P. mitsukurii* is tubular and closes abruptly towards the mouth forming an oval funnel.

Protobonellia papillosa, described by MURINA (1978), differs from the present species in the nature and distribution of the dermal papillae and in the structure of the proboscis. The basal part of the proboscis of *P. papillosa* has the form of an oval collar with thick, wavy borders and two long processes laterally. Furthermore, MURINA's description makes no mention of an interbasal muscle.

ETYMOLOGY : The species name is based on the papillae which are arranged in rings around the trunk.

Protobonellia sp. A (Plate 5 A-D)

MATERIAL : 1 female, Gorringe DW 5 : collected 22.IX.87 : locality coordinates 36°32' N-11°37,9' W, depth 180 m.

DESCRIPTION

Colour of proboscis and trunk of preserved specimen is creamy white. Trunk is cylindrical (plate 5 A), 3.5 mm long and 1.2 mm at broadest part. Body is evenly rounded at posterior end. Mid-dorsal region of trunk is damaged. Proboscis is broad and flat (plate 5 A), about 1 mm in length, with a straight anterior margin. Ventral surface of proboscis with transverse wrinkles probably due to contraction. Lateral margins of proboscis are free at base. Integument is thick and opaque. Raised papillae are distributed over entire surface of trunk but more closely aggregated at anterior and posterior ends. Papillae are aligned in transverse rows. Ventral setae (plate 5 B) minute, one pair, golden-yellow in colour, situated close to junction of proboscis and trunk. Cylindrical shaft of seta is narrower in middle region but flattened and spoon-shaped distally, terminating in a blunt tip.

Internally, foregut and anterior part of midgut is intact, the rest is damaged. Gonoduct (plate 5 C) single, sac-like, situated on right side of nerve cord. Gonostome is placed distally, gonostomal lip with minute frills, located on a short stalk. Ovary is elongate, situated along posterior end of nerve cord. Dorsal and neurointestinal vessels are indirectly connected by

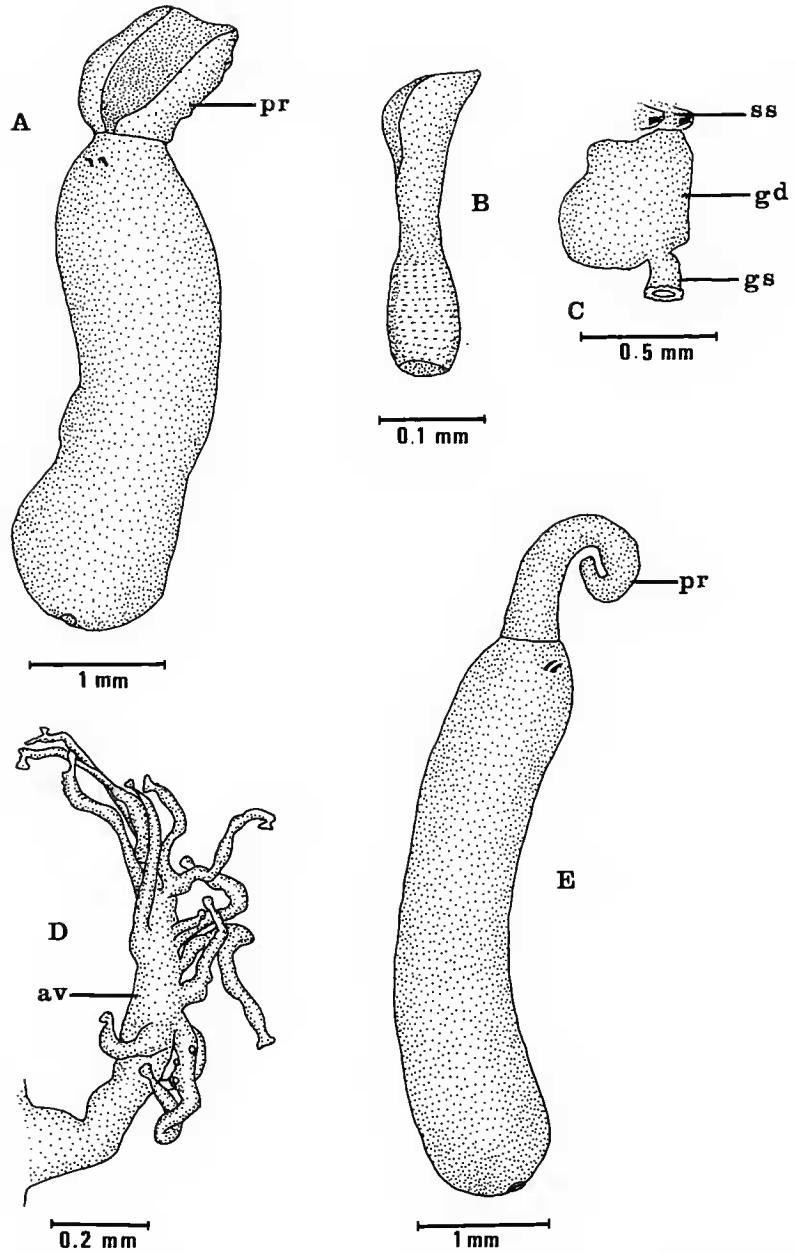


PLATE 5. — A-D, *Protobonellia* sp. A : A, ventral view of female; B, seta; C, gonoduct; D, anal vesicle. E, *Protobonellia* sp. B : lateral view of female. (Abbreviations : see plate 1.)

capillaries in intestinal wall. Neurointestinal vessel single throughout. Anal vesicles (plate 5D) are elongated tubular sacs with long unbranched tubules terminating in ciliated funnels. Setal sacs are close together without an interbasal muscle.

REMARKS

Two species are currently known in the genus *Protobonellia*, namely, *P. mitsukurii* Ikeda and *P. papillosa* Murina. The present specimen differs significantly from the above two species in possessing a gonoduct with a distally located gonostome. Other differences are apparent in the size of the animals, the nature and distribution of the dermal papillae and in the structure of the probosces. On the basis of the position of the gonostome it is evident that the specimen on hand is an undescribed species.

However, it is thought undesirable to erect a new species on the basis of a single individual. Its taxonomic position will have to await the collection of additional material from that region.

Protobonellia sp. B (Plate 5 E)

MATERIAL : 1 female, Gorringe DW 5 : collected 22.IX.87 : locality coordinates 36°32' N-11°37,9' W, depth 180 m.

DESCRIPTION

Colour of proboscis and trunk is white in preserved state. Trunk (plate 5 E) is 4 mm in length and 0.8 mm at broadest part. Proboscis (plate 5 E) is flat, 1.8 mm in length, not bilobed distally, with transverse wrinkles on ventral surface probably due to contraction. Lateral margins of proboscis are free at base without forming a funnel-like structure around mouth. Trunk is sausage-shaped and rounded at posterior end. Integument is transparent in middle region of trunk but somewhat opaque at both ends. Minute papillae are closely aggregated at anterior and posterior ends of body, aligned in transverse rows. Papillae inconspicuous in middle region of trunk. Ventral setae one pair, golden-yellow, located at anterior end of trunk. Setae hook-like with flattened terminal ends.

Internally dorsal and neurointestinal vessels communicate directly at posterior end of foregut without ring sinus. Neurointestinal vessel single, stout, joining ventral vessel posterior to setae. Gonoduct and gonostomes not seen, probably damaged due to poor preservation. Anal vesicles branch several times before terminating in ciliated funnels that are arranged on long stalks. Interbasal muscle between setae is absent.

REMARKS

As the gonoduct and gonostomes are missing it is difficult to assign the specimen to the correct species with certainty. However, as the proboscis is not bifurcated and the anal vesicles

are branched it seems very likely that it belongs to the genus *Protobonellia*. The present specimen is extremely small and falls within the size range given for *Protobonellia mitsukurii* by DATTAGUPTA (1975). A significant difference, however, lies in the structure of the proboscis. According to IKEDA (1908) and DATTAGUPTA (1975), the proboscis of *P. mitsukurii* is tubular and closes abruptly towards the mouth forming an oval funnel. Furthermore, IKEDA's description mentions that the trunk is ovoid and the ventral setae are located on a papilla-like elevation.

In view of the above differences it seems likely that the present specimen represents an undescribed species of *Protobonellia*. A detailed study of additional material in the future will shed more light on its taxonomic position.

Metabonellia sp.

(Plate 6 A-E)

MATERIAL : 1 sexually mature female, Gorringer DW 5 : collected 22.IX.87 : locality coordinates 36°32' N-11°37,9' W, depth 180 m.

DESCRIPTION

Colour of proboscis and trunk is white in preserved condition. Trunk is ovoid, 5 mm in length and 3.5 mm at broadest part. Proboscis is detached from trunk, 7 mm long and 1 mm broad, bilobed anteriorly. Lateral margins of proboscis are free at base. Integument is thin and transparent on dorsal surface but somewhat opaque ventrally. Papillae are distributed over entire surface of trunk but more conspicuous at anterior and posterior ends, aligned in transverse rows. Ventral setae one pair, golden-yellow, spoon-shaped distally with a small median spine at tip.

Proximal two-thirds of setal shaft with closely arranged concentric markings. Interbasal muscle between the setae is absent.

Gonoduct single, on left side of nerve cord, distended with eggs. Gonostome is funnel-shaped with small stalk, situated some distance away from distal extremity of gonoduct. Ovary in close relation with posterior part of ventral nerve cord. Contents of gut are moulded into faecal pellets; intestinal siphon absent. Dorsal and neurointestinal vessels in direct connection without a ring sinus. Neurointestinal vessel is single, stout, joining ventral vessel posterior to gonoduct. Anal vesicles are two main tubes branching once or twice before terminating in ciliated funnels.

REMARKS

The present specimen has been included in the genus *Metabonellia* because the gonostome is situated some distance away from the distal end of the gonoduct. Two species are currently known in the genus *Metabonellia*, namely, *M. gigas* and *M. haswelli* both of which differ markedly in size from the present specimen. Another difference lies in the structure of the

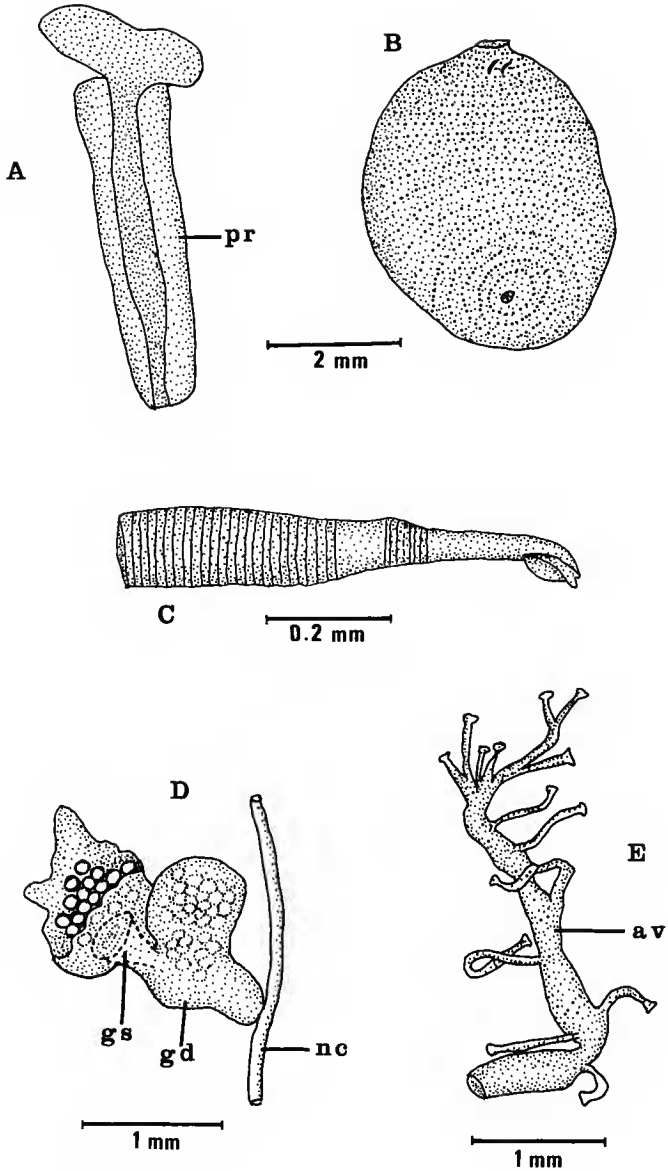


PLATE 6. — A-E, *Metabonellia* sp. : A, proboscis; B, ventral view of trunk; C, seta; D, gonoduct; E, anal vesicle.
(Abbreviations : see plate 1.)

proboscis which in the present specimen is bilobed anteriorly but not as deeply bifurcated as in the other two species.

In view of these differences it is evident that the present specimen represents an undescribed species. However, it is undesirable to create a new species on the basis of a single individual. Additional material in the future will probably shed more light on its taxonomic position.

Acknowledgements

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